

Richmond Refinery LPS Bulletin – Reliability



TKC P-713 Fire while P-713A Not Available



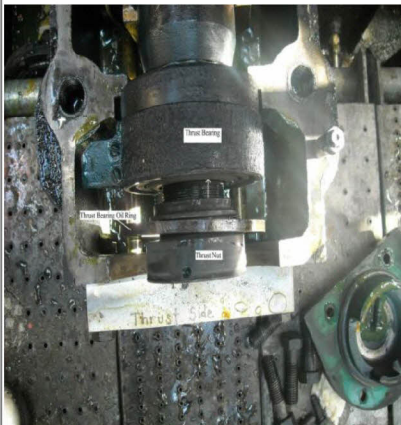
IPS Control: 1646404

Location: Hydro ABU,
North Isomax TKC Plant

Contact Information:

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Reference:



Thrust nut came off shaft



Failed thrust bearing

Tenets of Operations Violated: -

- 1) Operate within design limits

IIF message – Use root cause analysis to prevent repeat failures

Incident Description:

On Thursday evening September 24, P-713 primary bottoms pump at the TKC fractionator caught fire at the outboard seal. The spare pump P-713A had been recently repaired and installed but was waiting on the turbine to be repaired and installed, therefore, it was not ready to start up. The fire was relatively small and was extinguished fairly quickly. The fire damage in the area of the pump was minor. The TKC plant was shut down for three days to get the spare into service. The TKC plant suffered an economic loss of \$0.8 million due to reduced feed for the FCC plant.

Investigation Findings:

- 1) Lack of lock washer allowed the thrust nut to come off the shaft.
- 2) Pumps were operated below the minimum flow about 30% of the time in the last 9 months and 70% the week before the failure.
- 3) Both pumps had high vibrations at below-minimum flow rates.
- 4) Both pumps had failed thrust bearing and outboard seals this year.

Lessons Learned / Business Practices:

- 1) It is necessary to include all vital parts and lock the thrust collar nut lock washer when we make repairs.
- 2) Low flow rates may have been the root cause of high pump vibrations.
- 3) If a persistent low flow condition leads to potentially disabling an alarm, the root cause should be investigated first to search for an underlying risk potential.
- 4) Use root cause analysis to identify level of risk and compensating mitigation measures as part of unit reliability briefs.

What Worked Well:

- 1) The board operator noticed an open permissive on the pump in service and chose to pursue this with the field operator.
- 2) The field operator responded quickly and found the pump on fire.
- 3) Plant Protection was notified quickly, and TKC operators extinguished the fire and removed the equipment from service.

Recommendations:

- 1) Reinforce the need to evaluate the risk of potential threats by reviewing the investigation findings at a unit reliability brief.
- 2) Ensure the use of a robust thrust nut fastener design.

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